10. SELECTION OF FINAL PLAN

10.1 Base Plan

Original studies to investigate disposal options for dredged material in the Upper Saginaw River were initiated prior to the establishment of DMMP guidelines. This document has been prepared in accordance with recent procedures established for development, review and implementation of DMMP's. Based on current information in this Phase II DMMP Document, *Alternative 1 - Develop the Zilwaukee Township Site, West of Saginaw River, into a Dredged Material Disposal Facility* meets the criteria as engineeringly feasible, environmentally acceptable and least costly. Accordingly, information that follows is presented on the basis that reflects this option as the Base Plan.

Developing the Zilwaukee Township Site, West of Saginaw River, would consist of using 281 acres of the 581-acre site to construct perimeter dikes within the farmland. The remaining 300 acres will be used by Saginaw County for wetland mitigation. New interior dikes will be constructed to supplement the existing dikes (See figure 5, which shows a plan view and typical dike cross section), due to the lack of integrity of the existing dikes. The new dikes will be constructed of clay, which underlies the existing soils, and will be wider at the base and higher in elevation than the existing dikes to incorporate flood plain requirements and to meet the 20-year capacity requirements. The positioning of the offset dike is based on obtaining maximum volume and bearing capacity to support the dike within the DMDF. The entire dike construction may be accomplished in the initial construction.

A weir would be placed at the southern end of the site to address the effluent, which would then be drained back to the Saginaw River. A hydraulic pipeline at the northern end of the site will be used for hydraulic placement of the dredged material.

10.2 Project Advantages

Developing the Zilwaukee Township site, west of Saginaw River was chosen over the other sites because of the following major advantages: it is least costly, while being both engineeringly feasible and environmentally acceptable. Other advantages include that the location is sufficient enough in size to meet the required 20 - year capacity while being situated where a hydraulic pipeline from the river easily accessed. This site is much closer to the dredging operation areas compared to the much greater distance of hauling dredged material to Saginaw Bay Island CDF.

Onsite soil could be used to construct dikes, which contributes to making this alternative less costly than other alternatives.

10.3 Real Estate

The local sponsor (County of Saginaw) has agreed to acquire the necessary real estate interests for the Upper Saginaw River DMDF. The 2004 appraised value of the 281 acres of land required for the DMDF is $726,000. 10 percent of this value could be credited toward Saginaw County's share of the project cost. Fore more detailed analysis, see Appendix D, "Real Estate Plan".

10.4 Project Design

The Design Report (see Appendix A) includes a brief narrative, location map, plan view, cross sections, weir detail, and quantitative calculations for developing the Zilwaukee Township Site, West of Saginaw River, into a Dredged Material Disposal Facility.

10.5 Project Construction

The project construction would consist of stripping only the areas within the proposed perimeter dikes of the DMDF. Surface soil would be stockpiled and used as capping material for the filled cells. The rich soil would quickly vegetate, which would provide for a natural appearance to the placement site soon after capping. On-site sub-grade material (clay) would be excavated from the farmland to be used to construct the offset perimeter dikes.

The construction sequence is such that the entire perimeter dike and weir will be constructed at once. A typical construction operation would consist of (a) stripping the topsoil, (b) compacting the surface area immediately under the proposed perimeter dike, (b) excavating and stockpiling the clay for dike construction, (c) shaping and compacting the dikes and, (e) placing dredged material in cells. (See appendix A for details) If a specific dredging operation requires a cordoned off area, then the contractor could use temporary push up berms to isolate such areas.

10.6 Project Cost

The Cost Engineering Appendix shows the costs with contingencies for the project (See Appendix B). The appendix includes a brief narrative, cost summary table, and a detailed cost estimate. Table 4 shows a cost summary for Alternative 1 - Develop the Zilwaukee Township Site, West of Saginaw River. Table 5 shows a cost summary for alternative 2- Developing the Buena Vista Township Site, East of Saginaw River.

Table 4
Cost Estimate for Alternative 1 - Develop the Zilwaukee Township Site, West of Saginaw River, into a Dredged Material Disposal Facility. (2004 price level)

	Feature – Capital Costs	Quantity	Unit	Unit Price	Estimated Cost ($)
1	Mob & Demob	1	L.S.	$50,000.00	$ 50,000.00
2	Clearing & Grubbing	8	Acres	$ 2,500.00	$ 20,000.00
3	Stripping Unsuitable Material	145,000	C.Y.	$ 2.25	$ 326,250.00
4	Excavate Clay	191,000	C.Y.	$ 1.45	$ 276,950.00
5	Construct new dike with excavated material	191,000	C.Y.	$ 2.90	$ 553,900.00
6	Install weir	1	Each	$ 5,000.00	$ 5,000.00
7	Security Fencing	15,500	L.F.	$ 14.50	$ 224,750.00
	Subtotal				$ 1,456,850.00
	Feature – Indirect Costs	**Quantity**	**Unit**	**Unit Price**	**Estimated Cost ($)**
8	Engineering/Design (5% of capital costs)	1	Estimate	$57,683.00	$ 57,683.00
9	Construction Management (6%)	1	Estimate	$69,219.00	$ 69,219.00
	Subtotal				$ 126,902.00
	Total Capital (System & Engineering) Costs				$ 1,583,752.00
	Contingency (15%)				$ 237,563.00
	Total Present Worth				$ 1,821,315.00
				Say	$ **1,800,000.00**

Note: See detailed cost estimate provided in Appendix B.

Table 5
Cost Estimate for Alternative 2 - Develop the Buena Vista Township Site, East of Saginaw River, into a Dredged Material Disposal Facility. (2004 price level)

	Feature – Capital Costs	**Quantity**	**Unit**	**Unit Price**	**Estimated Cost ($)**
1	Mob & Demob	1	L.S.	$50,000.00	$ 50,000.00
2	Clearing & Grubbing	10	Acres	$ 2,500.00	$ 25,000.00
3	Stripping Unsuitable Material	129,000	C.Y.	$ 2.25	$ 290,250.00
4	Excavate Clay	271,000	C.Y.	$ 1.45	$ 392,950.00
5	Construct new dike with excavated material	271,000	C.Y.	$ 2.90	$ 785,900.00
6	Install weir	3	Each	$ 5,000.00	$ 15,000.00
7	Security Fencing	10,080	L.F.	$ 14.50	$ 146,160.00
	Subtotal				$1,705,260.00
	Feature – Indirect Costs	**Quantity**	**Unit**	**Unit Price**	**Estimated Cost ($)**
8	Engineering/Design (5% of capital costs)	1	Estimate	$85,263.00	$ 85,263.00
9	Construction Management (6%)	1	Estimate	$102,316.00	$ 102,316.00
	Subtotal				$ 187,579.00
	Total Capital (System & Engineering) Costs				$ 1,892,839.00
	Contingency (15%)				$ 283,926.00
	Total Present Worth				$ 2,176,765.00
					Say $ **2,200,000.00**

Note: See detailed cost estimate provided in Appendix B.